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of Charles III. it is probable that the population barely reached eight millions. Some figures given by Sr. Costanzo Stella in the London *Times* show clearly the progress of the country. The agricultural population, which was but three million six hundred and fifteen thousand eighty-five years ago, is now nine million three hundred and twenty-eight thousand, and the area cultivated has increased from fifty-three million acres to one hundred and ninety-three million five hundred thousand. The head of cattle have doubled since the commencement of the century, and the industrial population has trebled. In 1860 exports and imports together were only twenty-five million eight hundred thousand pounds, whereas they are now fifty-six millions. The wine of Spain, which two decades ago could not be brought into the world's market, except from spots situated within easy distance by bullock-wagon of some port, can now be borne upon six thousand miles of railway, and the produce is reckoned at four hundred and sixty-one million two hundred and fifty-six gallons.

Prof. Miguel Marazta has discovered, in the valley of Rebas (Gerona, Spain), at the end of the Eastern Pyrenees, a race of dwarfs not more than four feet high. All have red hair, broad faces, strongly-developed jaws, flat noses, and rather oblique eyes. A few hairs take the place of a beard in the males, and the sexes are very much alike. The lips do not quite cover the large, projecting incisors. They live by themselves, intermarry, and have no chance of improvement. Are they the remnants of some old Mongoloid stock?

The last French census (May, 1886) shows an increase of only one per cent. per annum, and the last German census one of .71 per cent. per annum. In both cases this is a decrease in the rate, Germany, as well as France, having commenced to proportion its increase to the means of subsistence.

GEOLOGY AND PALÆONTOLOGY.

The Sea-Saurians of the Fox Hills Cretaceous.—The reptiles of the sea of the Fox Hills epoch possess considerable interest as being the last of their race; for the next epoch (the Laramie) saw, as is well known, the beginning of the lacustrine conditions which prevailed throughout the interior of North America, in one region or another, during the subsequent ages of Cænozoic time. The vertebrate fauna was more or less changed, especially so as regards the inhabitants of the waters. The most important modification of this kind with which we are acquainted is the extinction of the order Sauropterygia from the interior waters of North America. I have made some attempt to collect remains of these animals, but without any great success, for two reasons. One of these is the rarity of the specimens; the other is the disarticulated condition in which they are usually found.

Preliminary to a fuller account of the species, I give the following abstract of the results I have been able to obtain.

The Plesiosauridæ have been well divided by Seeley[1] by reference to the characters of the scapular arch and sternal region. Another criterion of difference is to be found in the form of the propodial bones. In the Polycotylinæ they are wider than long, and angular in form, resembling those of Ichthyosaurus. In the Plesiosaurinæ they are well-differentiated elements, as in Mosasaurus, or marine turtles. There are two genera of Polycotylinæ, both American, as follows:

Neurapophyses and all diapophyses and parapophyses coössified with vertebral centra	*Polycotylus.*
Neurapophyses and other processes articulating freely with centra	*Piptomerus.*

Of these, Piptomerus is represented by numerous remains in the Fox Hills beds of New Mexico. Other species occur, which present the following characters:

Neural arches loosely articulated	*Plesiosaurus.*
Neural arches coössified, parapophyses free	*Orophosaurus.*
Both neural arches and parapophyses coössified	*Uronautes.*

Of these genera, Uronautes has been previously obtained in the Fox Hills bed of Montana.[2] The probable character of the propodial bones refers it to the Plesiosaurinæ. These parts are unknown in the species referred to the two other genera named. Nor is it certainly known whether the structure of the shoulder-girdle is like that of Elasmosaurus or of Plesiosaurus; so that reference of a species to the last-named genus is provisional. The only possible duplication of names of the above genera is in the case of Orophosaurus, which might possibly be referable to Cimoliasaurus (Leidy); but if, as I believe, the individual described is adult, the two genera are quite distinguishable. The other characters of the genera and of the species are as follows:

Piptomerus Cope, g. n.—Cervical vertebræ short, slightly biconcave; dorsal vertebræ very short, nearly amphiplatyan; nutritive canals many, large. In the known species the articular surface is reflected on the sides of the centrum, so as to restrict the width of the dense layer. In the known species there is no nutritive foramen between the facets of the neur- and parapophysis in the cervical vertebræ. Free extremities of parapophyses thin-edged.

Piptomerus megaloporus, sp. nov.—Cervical centra wider than deep, longer than the dorsals, with a rather wide plane between fossæ of neur- and parapophysis. Two inferior foramina. Sutural surfaces of articular fossæ generally not roughened. Dorsal centra much compressed; neurapophysial fossa very oblique, with a large foramen below its external margin. Two or more small foramina on the inferior surface.

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[1] Quarterly Journal Geological Society London, 1874, p. 436.

[2] Proceedings Academy Philada., 1876, p. 345.

Diameters of a cervical vertebra,	anteroposterior	.0175
	vertical	.023
	transverse	.030

Diameters of a dorsal vertebra,	anteroposterior	.0125
	vertical	.029
	transverse	.027

Diameters of a propodial bone,	length	.019
	width	.043
	depth	.020

An abundant species in New Mexico.

Piptomerus microporus, sp. nov.—Dorsal vertebræ larger, and with a comparatively small nutritive foramen adjacent to the neurapophysis. Cervical vertebræ (if correctly identified) less robust than those of *P. megaloporus*, and with the neur- and parapophysial fossæ separated by a narrow plane-surface.

Diameters of cervical centrum,	anteroposterior	.016
	transverse	.035
	vertical	.0215

Diameters of dorsal centrum,	anteroposterior	.019
	transverse	.036

Two dorsal vertebræ certainly, and probably several others, and a cervical vertebra represent this species. New Mexico.

Piptomerus hexagonus, sp. nov.—Founded on a cervical vertebra, which is less robust than those of the other species, and which differs in having the neur- and parapophysial surfaces adjacent, and not separated by a plane-surface. The two inferior foramina are of very large size, and are well separated.

Diameters of cervical centrum,	anteroposterior	.013
	vertical	.024
	transverse	.031

Several similar but smaller vertebræ are contained in the collection. New Mexico.

Orophosaurus pauciporus, sp. nov.—Represented by parts of three cervical vertebræ, with large parapophysial fossæ looking downwards and outwards, which present a coarse sutural surface of the fundus. The basis of the entirely connate neurapophysis is compressed, and between it and the margin of the parapophysial fossa is an obtuse longitudinal angle. A very small nutritive foramen at the base of the neurapophyses. No other lateral foramina.

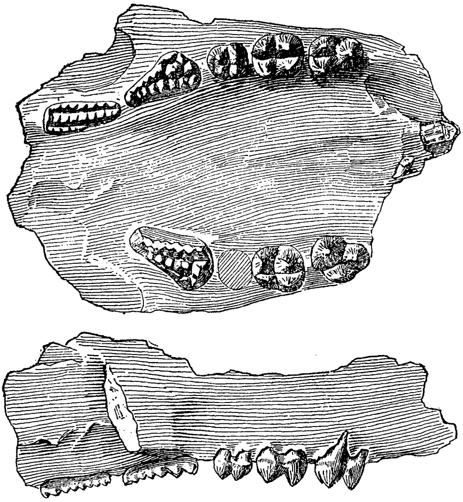
The vertebræ are more robust than those of Piptomerus, and are but little wider than deep. The articular surfaces are slightly concave medially and swollen at the circumference, where they are separated from the lateral surfaces by a shallow groove. Lateral surfaces with irregular, shallow, pore-like fossæ.

Diameters of articular face of cervical vertebra	anteroposterior	.034
	vertical	.040
	transverse	.046
Diameters of parapophysial fossa of same	vertical	.018
	transverse	.024

New Mexico.

In addition to these species, I have vertebræ of three other species of Plesiosauridæ from the Fox Hills bed of New Mexico, which are not sufficiently well preserved for description. One of these is nearly allied to the *Uronautes cetiformis* Cope, but is larger than the type. The other two may be provisionally referred to Plesiosaurus. Accompanying them are *Ischyrhiza antiqua* Leidy, Enchodus, sp., *Galeocerdo pristodontus* Ag., Otodus, sp., and other characteristic forms. The characters observed in the cervical vertebræ of the six species of Sauropterygia of the Fox Hills formation, confirm a hypothesis proposed by the writer in 1879.[1] This is that the necks of the species grew shorter with lapse of geological time, and as the sea shallowed. The long-necked forms are in America confined to older horizons of the cretaceous.—*E. D. Cope.*

The Marsupial Genus Chirox.—This genus was described by the writer in 1883,[2] from a few teeth of the upper jaw found in the Puerco formation of New Mexico. Since then a palate with the entire molar series of one side and nearly all that of



Chirox plicatus Cope, palate with dentition, viewed from below; $\frac{1}{2}$ natural size.

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[1] American Naturalist, 1879, p. 131.

[2] Proceedings Amer. Philos. Soc., p. 321.

the other has been obtained. This shows that the teeth described are premolars, and that there are two true molars, which resemble those of Polymastodon and Neoplagiaulax. The premolars are a good deal like those of Plagiaulax, as described to me by Professor Osborn, and the question arises whether the dentition in question does not belong to Ptilodus. There are two reasons for answering this question in the negative. First, in Plagiaulax and Neoplagiaulax, according to Osborn and Lemoine, there is a tooth in the superior series resembling and opposing the peculiar-cutting fourth premolar of the inferior series; second, the only tooth which could oppose such an inferior premolar is the first molar, and this is not worn obliquely, as in Plagiaulacidæ, but transversely, as in Polymastodon. This and the second true molar support two and parts of a third longitudinal rows of cusps, which are, on the last tooth, worn by anteroposterior movement of an inferior tooth of corresponding form.

Chirox, then, is allied to the Polymastodontidæ, but differs from it in the possession of superior premolars. I therefore see in it the representative of a new family which I call the Chirogidæ. This family forms an interesting connecting type between the Plagiaulacidæ and the Polymastodontidæ. Chirox further differs from Polymastodon in having a second superior premolar of identical form with the first. It constitutes another indication of the Mesozoic character of the Puerco fauna.—*E. D. Cope.*

Geological News.—SILURIAN AND DEVONIAN.—H. A. Nicholson describes, in the *Annals and Magazine of Natural History*, some new and imperfectly-known Stromatoporidæ. Four of the species of Clathrodictyon occur in the Devonian and one in the Silurian of Canada.

M. Bureau has taken casts of some markings upon a muddy surface, and found that he had well-characterized Bilobites. Yet the markings were made by the tail of a shrimp in swimming.

MESOZOIC.—Mr. A. S. Woodward notes the undoubted presence of a columella in the skull of Ichthyosaurus, and figures the same (*P. Z. S.*, June, 1886). Professor Cope had first given a diagrammatic outline of the bone.

Mr. J. Carter, in a recent communication to the London Geological Society, adds fifteen or sixteen species to the fossil Decapoda of Great Britain. These occurred in the Oxford Clay at St. Ives. Only one had previously been recorded as British, seven were new to science, and nearly all are Macrura.

TERTIARY.—The fossil Mammalia of Maragha, in Northwestern Persia, include many species identical with those of Pikermi, Greece. The deposit was discovered thirty years ago, and the beds, which are situated to the east of Lake Urumia, consist chiefly of reddish marls of fluvio-lacustrine origin. A Hipparion, probably identical with the Pikermi *H. gracile*, is the most abundant. *Giraffa attica*, *Palæoryx pallasi*, *Sus erymanthius*, *Mastodon pentelici*, and *Helladotherium duvernoyi* are among the remains, as is also the French *Felis brevirostris*.

The lower jaw of a Machærodus has been described from the "Forest-Bed" at Kessingland, Suffolk, England. The describer, Mr. J. Backhouse, stated his belief that hitherto no lower jaw of the genus had been found in England.

Mr. Lydekker has given to the Geological Society of London a list of the Cetacea of the Oxford Crag. These include Balæna (4 sp.), Megaptera (3 sp.), Balænoptera (4 sp.), Cetotherium (4 sp.), and *Herpetocetus scaldiensis*, together with nineteen species of Physeteridæ, one Squalodont, and three Delphinidæ. There are seven species of Mesoplodon.

Out of seventy-eight species or varieties of chilostomatous Bryozoa from a deposit in New Zealand, which was considered Miocene by Tenison-Woods, sixty-one are known living, and it would thus seem that too remote an age has been assigned to the deposit.

MINERALOGY AND PETROGRAPHY.[1]

Petrographical News.—The second[2] paper devoted to the study of the massive rocks belonging to the "Cortland series" on the Hudson River, near Peekskill, has recently appeared in the *American Journal of Science*.[3] In this paper the author, Dr. G. H. Williams, describes the norites and related rocks, which make up by far the greater part of the entire Cortlandt series. These norites are divided into norites proper, hornblende norites, mica norites, hyperites or augite norites, and pyroxenites. The norite proper is very rare, almost all sections showing the presence in small quantity of minerals which would, in accordance with a strict classification, require the rock to be placed in one of the other four groups. The most interesting facts brought out in the examination of these rocks are (1) the occurrence of orthoclase in several specimens, and (2) the existence of numerous inclusions in this orthoclase and in the more prevalent andesine. The orthoclase is in porphyritic crystals, in which are sometimes imbedded smaller crystals of plagioclase. Under the microscope the former is seen to possess a "shagreen" surface, due to numerous oval indentations. All the feldspar of the norites is filled with little inclusions of plates, rods, and dots. These seem not to be arranged in any definite position with regard to crystallographic

[1] Edited by Dr. W. S. BAYLEY, Madison, Wisconsin.

[2] *Cf.* American Naturalist, March, 1886, p. 275.

[3] Amer. Jour. Science, xxxiii., February, p. 135; March, p. 191.